Project Stock Rank

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Motivation & Summary

Our Goal:

- Apply what we've learned through the context of investing in equities
- Develop a program to help streamline fundamental ratio analysis for evaluating stocks (not stock price)
- Directly compare the financial health of select stocks, based on current financial data
- Apply a proprietary weighting to ratios to help sort stocks based on different risk profiles

Questions Asked:

- What ratios do we want to focus on and why?
- Do we want to focus on other forms of analysis (back testing, technical analysis, volatility)?
- What is feasible given our constraints (timing, data, expertise)?

Our Starting Point:

- Make a program that outputs a ranking of stocks based on financial health by way of ratio analysis. Focus on simplicity & clarity.

Questions & Data

How do we achieve our goal?

- First and foremost, find a data source that allows us access to robust financial information:
  - We found our solution through https://financialmodelingprep.com/ (“FMP”)
  - FMP is an API that synthesizes financial data, with the ability to to output key financial ratios for the majority of publicly traded equities
  - FMP allows an individual input a Ticker Symbol into code (using an URL and an API), returning a python dictionary of financial ratios

Additional Data?

- Given our program focuses on a stock’s fundamental financial health at a specific point in time, rather than stock price performance (historical or proforma), we utilized the https://pypi.org/project/FundamentalAnalysis/ (“FA”) python library to draw in relevant market data to assist the investor with their decision making process

Our Data Analysis

The six financial ratios we selected each fit into one of the four categories:

- Profitability (Selected: Gross Profit Margin Ratio & Net Profit Margin Ratio)
- Liquidity (Selected: Current Ratio)
- Leverage (Selected: Cash Flow to Debt & Debt to Market Capitalization)
- Cash Flow (Selected: Free Cash Flow Per Share)

Our proprietary ranking system used three different weighting profiles:

- Conservative: Focusing on liquidity and low debt
- Balanced: Assigning an equal ranking to all ratios
- Growth: Focusing on profitability and free cash flow (notably, the growth profile is one that could use some different and/or better metrics based on revenue growth rates or qualitative factors)

Our thesis was that each of the above ratios, when combined to form a holistic picture of a company, would give an investor a decent insight into a company's financial health. Our program then compares and ranks a bucket of stocks based on that financial health.

Demo

Data Cleanup & Exploration

Our data exploration consisted of:

- Selecting the desired API (FMP) and python library (FA) from which to draw information
- Determine which ratios we wanted to base our analysis on
- Running those variables through a function applying our proprietary weighting
- Ranking stocks based on financial health, as represented in recent SEC reporting information
- Providing additional stock price info to assist in a buy or sell decision

Limitations of the data used:

- FMP is a free API and, while robust, not all ratio calculations were available for every company
- We found that larger more popular equities had more consistent data sets to draw from
- FMP attempts to pull the most recent public financial data for every company; however, the data wasn't always current (e.g. one company's ratios may be based on 12/31/19 data and another on 9/30/2020 data)
- If a company has a ratio that is an outlier (extremely high or extremely low) it tends to skew the ranking, even with an applied weight
- Data only tells part of the story, it is also important for an investor to look at other factors

Data Analysis & Discussing Results

Our Findings?

- We were ultimately successful at drawing in specific financial metrics for each company (up to five companies) of an investor's choice. Those metrics were entered into our proprietary ranking function and output into a table. We also successfully integrated an additional python library that provided additional color on relevant market data.

While successful…

- It became quite obvious that financial ratio analysis only tells part of the story. An investor would need to apply other various means of research (qualitative, macro economic, momentum, sentiment, price, etc.) to truly make an informed decision. Our tool could, as presented, play an important piece in the decision making process, but should not be the sole analysis relied upon.

Postmortem

Stock Ranking & Selection:

- Is both an art and a science: it is difficult to determine a stocks proper “rank” based on one form of analysis. Yes, our tool does effectively rank stocks based on financial health using ratios; however, this doesn’t tell the full story of stock and many more elements could be added to make it more robust, as mentioned in the previous slide.
- Good data is hard to come by: we believe both FMP and FA are powerful tools that provide a lot of value to individual investors such as ourselves; however, some of the data was limited (ratios not being available and/or time frames not aligning), and proper due diligence should include an in depth analysis of how each of those ratios is being calculated
- Every company is different (and value vs. growth): comparing the ratios of one company to another doesn’t always make sense given different industries have different models; different sized companies have different standards; and in some instances, such as in value vs. growth, the ratios may not matter at all when it comes to making a buy or sell decision
- Next Time: Instead of making significant changes to our existing tool, it may be more helpful to have three or for more additional tools to rank the other variables important in investing decisions. The Investor can then use all of those outputs to make a decision.

Q&A:

Thank You!

Kedar, Alex, & Nick